

slide operation or the press operation is executed, the respective display regions enable the concave and convex touch feeling to be given to the operator's fingers. The concave and convex touch feeling in such a second group occurs on a fact in which the air-circulation unit 3 is controlled such that the flow channel changeover unit 3a selects the flow channel 2b to send the air to the base member 101 which is concurrently used as the flow channel panel.

[0154] In this manner, according to the mobile phone 600, the representation position of the convex and concave shape thereof is changed depending on the states of the applications #A and #B of the operation key screen, so that in case of the comparison with the key board of the past or the fixation system of the past system, in the same area, specifically "in the sense of touch-like meaning for representing the surface shape", it becomes possible to constitute various input units.

[0155] The following will describe a control system or the like of the mobile phone 600. FIG. 20 shows a configuration of the control system of the mobile phone 600 and the touch-sensitive feed back function example thereof.

[0156] In this example, the amount of air which is supplied to the element bag portions E1 to E25 for representing a sense of touch is adjusted for every group by controlling the piezoelectric unit 315 of the touch-sensitive variable sheet unit 103, thereby enabling the changed sense of touch to be given to the operator's finger 30a (operation body).

[0157] The mobile phone 600 shown in FIG. 20 contains a control unit 15, a receiving unit 18, a transmitting unit 22, an antenna diplexer 23, the input detection unit 45, the display unit 29, a power supply unit 33, a camera 34, a memory unit 35, a speaker 36a for an incoming melody, a speaker 36b with actuator function and the touch-sensitive variable sheet unit 103. The input detection unit 45, the display unit 29 and the touch-sensitive variable sheet unit 103 constitute the input device 300.

[0158] The input detection unit 45 detects a slide position and a press by the finger 30a of the operator 30 and outputs at least a position detection signal S1 showing the slide position and a press detection signal S2 showing a pressing force F to the control unit 15. For the input detection unit 45, there is used a capacitive input device, a resistive input device, an input device of surface acoustic wave system (SAW), an input device of an optical system, an input device of a multi-stages system tact switch or the like.

[0159] The input detection unit 45 is connected to the control unit 15. The control unit 15 includes an image-processing unit 26, an A/D driver 31, a CPU 32 and a storage unit 37. The A/D driver 31 receives the position detection signal S1 and the press detection signal S2 from the input detection unit 45. The A/D driver 31 converts an analog signal composed of the position detection signal S1 and the press detection signal S2 to digital data in order to distinguish the function of the cursoring and the function of the icon selection. Other than this, the A/D driver 31 calculates the digital data, detects which is a cursoring input or icon selection information, and supplies flag data D3 by which the cursoring input or the icon selection is distinguished, the position detection information D1 or the press detection information D2 to the CPU 32. These calculations may be executed in the CPU 32.

[0160] The A/D driver 31 is connected with the CPU 32. The CPU 32 controls the whole of the mobile phone based on a system program. The memory unit 35 stores system program data for controlling the whole of the mobile phone. A RAM, which is not shown, is used as a work memory. The

CPU 32, at the same time when turning the power ON, reads the system program data out of the memory unit 35 and expands the program data in the RAM, turns on the system and controls the whole of the mobile phone.

[0161] For example, the CPU 32 receives the position detection information D1, press detection information D2 and flag data D3 (hereinafter, simply referred to as the input data) from the A/D driver 31 and controls so as to supply a predetermined instruction data D to the devices of the power supply unit 33, the camera 34, the memory unit 35, the storage unit 37, an image-and-audio-processing unit 44, the touch-sensitive variable sheet unit 103 or the like. The CPU 32 also takes-in the reception data from the receiving unit 18 and transfers the transmission data to the transmitting unit 22.

[0162] In this embodiment, the CPU 32 is connected to the touch-sensitive variable sheet unit 103, in addition to the input detection unit 45, which under a driving control of the CPU 32, adjusts an amount of air which is supplied to the element bag portions E1 to E25 for representing a sense of touch for every group through the piezoelectric unit 315, thereby enabling the sense of touch which is given to the operator's finger 30a (operation body) to be changed.

[0163] The CPU 32, for example, compares the press detection information D2 obtained from the input detection unit 45 with a preset press judgment threshold Fth and based on the comparison result thereof, outputs a predetermined instruction data D to the touch-sensitive variable sheet unit 103 to driving-control the piezoelectric unit 315 thereof. Here, when the sense of touch transmitted from the input detection surface in the press position of the input detection unit 45 is supposed to be as #a and #b, the sense of touch #a is provided by changing the input detection surface corresponding to the pressing force F of the operator's finger 30a in the press position thereof from a vibration pattern with a low frequency and also small amplitude to a vibration pattern with a high frequency and also large amplitude.

[0164] Also, the sense of touch #b is provided by changing the input detection surface corresponding to the pressing force F of the operator's finger 30a in the press position thereof from a vibration pattern with a high frequency and also large amplitude to a vibration pattern with a low frequency and also small amplitude. These vibration pattern output controls in the input detection surface are executed by executing the driving control by the piezoelectric unit 315 of the touch-sensitive variable sheet unit 103. It is needless to say that the storage unit 37 may be controlled so as to vibrate the speaker 36b with actuator function. It should be noted that the vibration control of the speaker 36b may be omitted. In a case in which the touch-sensitive variable sheet unit 103 is driving-controlled, the medium is air and the amount thereof is adjusted and controlled, so that it becomes possible to present stronger sense of touch as compared with the vibration of the speaker 36b.

[0165] The above-mentioned CPU 32 is connected to the display unit 29 and the memory unit 35 which stores display information D4 for displaying the display screen for input item selection, for example, three-dimensionally, control information Dc relating to the selection position and the vibration mode of the icon corresponding to the display information D4 and the like for every display screen. The control information Dc includes a plurality of specific vibration waveforms which generates a plurality of different senses of touch synchronized with application (three-dimension-like display and various kinds of display contents) in the display